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Fixed-fee *versus* unregulated-fee? A work-leisure trade-off model for general practitioners in France*

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This article presents an adaptation of the labour supply model applied to the independent medical in which doctor's choice of the length of consultations is examined. A theoretical analysis is performed in an attempt to define the sets of constraints to which self-employed doctors are subject, and they show a marked difference in time-allocation behaviour according to whether medical care is provided under a fixed-fee scheme or under an unregulated-fees scheme, respectively "sector 1" and "sector 2" in France. The objective of this econometric study was to analyse time-allocation choices made by doctors in both sectors in France and to validate the theoretical prediction that doctors under unregulated-fees can make choices about the length of patient consultations independently of their personal leisure choices. According to our empirical results, doctors with unregulated-fees indeed show different behaviours regarding leisure-consumption choices and consultation length. The endogeneity of leisure choice to consultation length –verified in fixed-fee scheme- is no longer apparent under unregulated-fee. Our findings can be seen as a necessary, but insufficient, condition for legitimate unregulated fees in general practice.

Keywords. *"Work-leisure trade-off". "Working time". "Consultation duration". "payment schemes". "General practitioners". "Simultaneous equations".*

JEL codes. *C13. C31. I11. J22. J30*

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Introduction

Planning the supply of ambulatory healthcare is a key component of the healthcare organisation in a country, both from the perspective of the well-being of the population and the perspective of public finances or health insurance. Independent ambulatory healthcare, which has been adopted by many countries for greater freedom of choice and higher quality of treatment, nevertheless comes at a cost. Public authorities can control fewer aspects of the system. In fact, three crucial parameters currently escape the control of the regulator: the location of the activity, the length of work, and the length of patient consultations, all of which have been associated with the quality of healthcare. The location and the geographic dimensions do not fall within the scope of this paper (see, for example, Scott, 2001[1]). Different types of incentives can be implemented to better control physicians when they establish their practices. This paper focuses on the two other aspects of control mentioned above: duration of work and duration of patient consultation, which are perhaps the most difficult to control in an independent medical sector.

Few studies examining independent practitioners have simultaneously analysed total work time and the length of patient consultations. The few available references concerning determinants of the length of consultation highlight medical factors: patients' characteristics, the prevalence of severe illness, and sometimes physicians' characteristics such as gender, age, and modalities of economic organisation (e.g. group practice versus solo).[2] Few studies have attempted to link the "length of consultation" to the "total work time", such as to test the relationship by which total work time, which is an indicator of the availability of the doctor, can influence the time devoted to individual patients. Labour economists have taken an occasional interest in the overall labour supply of doctors.[3]

[1] In other countries, such as Canada, financial incentives have already been introduced specifically aimed at encouraging doctors to set up practices in the regions of Quebec where there is a lack of doctors (Bolduc et al, 1996).

[2] Martin *et al.* (1997) and Carr-Hill *et al.* (1998), for example, find that female doctors dealing with patients of the same sex hold the longest consultations. Deveugele *et al.* (2002) claim that one-third of the variability in lengths of consultation is due to characteristics of the doctors and two-thirds is due to characteristics of the patients. These authors used data comparing several series of consultations in different Western countries. Scott and Shiell (1997) report similar results for Australia.

[3] The relevant references in the field are: Sloan (1975), Noether (1986), Rizzo and Blumenthal (1994). The last provide an estimation of the elasticity of 0.23 for the labour supply to wages, with an adjusted price-elasticity of 0.44. In a study of the response of the medical labour

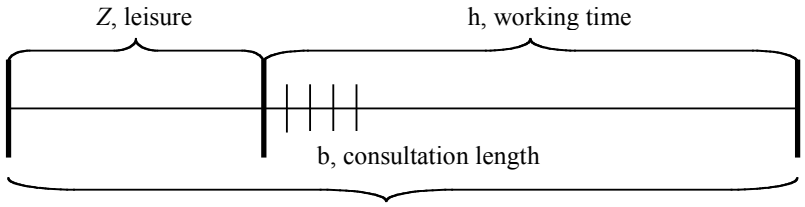
However, even in these studies, the length of consultation is often left aside, in our opinion, for two reasons:

-the scarcity of data allowing researchers to test for interaction among the length of consultation, patients' characteristics, and the physicians' socio-economic characteristics, e.g., income, prices, and other data necessary for defining the work/leisure trade-off; and

-a "cultural bias" in labour economics, which gives that investigators rarely consider labour supply outside a wage-based contract and so they rarely take into account the specificities of independent activities (e.g., for lawyers, notaries, physicians) for which payment per hour cannot be computed from tariffs only (because, in fee-for-services, the time devoted to services may vary).

The dual dimension of these choices is illustrated in Figure 1. The time endowment Z_0 is divided into two traditional components: leisure and working time. However, contrary to standard labour economics, the latter is not "homogeneous," and it depends on the choice of consultation length. A given working-time can therefore be calculated from multiple combinations of consultations of different length. The physician has a larger choice set with which to construct her consumption-leisure trade-off, but at the same time she also faces a larger set of constraints.

Figure 1. Work/leisure tradeoff and free distribution of consultations



In this paper, we present a standard work/leisure trade-off model adapted to *independent medical activity*, which contrasts with contractual labour in the following characteristics: no flat-rate payment (tariff per consultation), greater freedom in determining schedules (length of consultation), but a stricter and more direct set of medical and professional constraints concerning work activity and income (the patients are "customers"). Section 1 attempts to define the sets of constraints (economic and medical) to which independent doctors are

supply to the tax system, Showalter and Thurston (1997) find that self-employed doctors are more sensitive to the marginal rates of taxation, with an elasticity of 0.33, than are wage-earning doctors. A study of Norwegian micro-data by Sæther (2003) confirms that the response of wage-earning hospital doctors is low.

subject when choosing their activity. This allows us to more accurately determine *the factors influencing the length of consultation* and *the rules of work/leisure trade-off* for this profession. Section 2 presents the data obtained from a sample of 1,901 general practitioners (GPs) working independently in 2006 in five regions of France. The empirical study discusses the theory, using the specificities of the French independent medical sector with two payment schemes sectors coexisting (see Appendix B for a brief description). The objective of the econometric study was to test whether doctors' choices are affected by the payment characteristics of the sector in which they operate (unregulated *versus* fixed fees). Section 3 presents the results of econometric modelling, which show highly contrasting behaviours between doctors in "sector 1," limited by a fixed-fee system --i.e. fixed by an agreement between national health insurance and physicians' trade unions that allows patients to be reimbursed by public health insurance-- and doctors in "sector 2," where there is greater freedom for doctors to set the fees.

1. Supply of services by GPs

In this section we present a behavioural model for the supply of services by GPs according to the characteristics of their environment. The choice of the doctor is illustrated in the framework of the neo-classical theory of the labour supply, taking into account the economic and medical constraints that independent doctors face when choosing their time-activity.

1.1. Objectives, constraints, and choice of activity in the case of an ambulatory general practitioner

In the context of labour supply theory, the doctor's aim is to obtain an income from her work that enables her to finance all or part of her consumption (her standard of living). Formally, the physician's choice can be expressed as follows:

$$\max_{C,Z,w} U(C,Z) \quad sc \begin{cases} C = wn \\ Z = Z_0 - nb \\ b \geq \overline{b} \\ n \leq d(w,b) \end{cases} \tag{1}$$

The objective function traditionally adopted is a utility function $U(C,Z)$ integrating the consumption of a generic good, C, and leisure, Z (Thornton and Eakin (1998)). Leisure is

defined as the amount of time available once the medical activity is completed. The doctor has a fixed time endowment, Z_0, which she is free to distribute between leisure, Z, and the total time of her medical activity. Each consultation has a length denoted by b. The doctor undertakes a number of consultations, n. The price of the consumer good is fixed per unit, and the price of each consultation is expressed by w. In programme 1, physicians are confronted with a number of constraints:

- a budgetary constraint regarding the purchase of consumer goods;
- a time constraint distributing the time available between work and leisure;
- a constraint on the minimum quality of healthcare provided with a minimum threshold for the length of consultation (noted as $\bar{b}$). This constraint may be based on respect for professional standards or institutional rules, patient demands, or even social behavioural rules;
- a market constraint, since the supply of independent healthcare services must correspond to patients' demand.

We consider that each doctor acts in a context of monopolistic competition. She is therefore facing a demand with finite price elasticity. The demand for GP services $d(w,b)$ is a function of the price of those services (price per consultation) and the length of the consultation (b). McGuire (2000) proposes a "net benefit function" for the patient that depends on the fee, the level of medical activity, and the level of quality provided by the physician. This net benefit function plays a role similar to our demand function. The patient is sensitive to the price of medical activities and to the level of quality supplied by the physician. In our model, we consider "quality" and "length of consultation" equivalent, an assumption already suggested by McGuire (2000) and confirmed by empirical studies (Freeman at al. (2002) for a review of Britain). In short, this means that patients perceive the length of consultation as a measure of quality.

For medical labour supply, the message of this model is that the "cost of quality" is defined by the value of the time spent in each consultation in terms of leisure losses. Doctors not only have to decide their total working-time, but also to fine-tune a partition of total working-time between quantity and quality. The final choice regarding Z (total time) and b (length of consultation) will be a complex trade-off defined at both the supply side (intrinsic preference for leisure) and the patient side (demand for quality).

The characteristics of the healthcare system also influence the possible choices of ambulatory medical activity. The model enables us to describe two simple situations. In the first case, the price of a consultation is centrally established and is the result, for example, of negotiations between the unions and the Social Security or an arbitrary price fixed by the

government. When the price of a consultation is set, the doctor can decide only the length of the consultation and the number of consultations undertaken. In the case of "deregulated fees," the doctor can adjust her prices above the minimum level established by the regulations. These two situations are studied successively in order to demonstrate the interaction between institutional and economic constraints and the preferences of the self-employed GP in choosing her activity.

1.2. Choice of activity and fixed price per consultation

For doctors subject to a fixed-price $\overline{w}$, the choice is based on the length of consultation *b* and the number of consultations *n*. In this context, the first-order Kuhn and Tucker conditions of programme (1) can be written as follows, maximising *U* in *n* and *b*:

$$\begin{cases} \overline{w}U_C - bU_Z + \lambda_2 = 0 \\ -nU_Z + \lambda_1 - \lambda_2 \partial d\left(\overline{w}, b\right)/\partial b = 0 \\ \lambda_1\left(b - \overline{b}\right) = 0 \\ \lambda_2\left(n - d\left(\overline{w}, b\right)\right) = 0 \end{cases} \tag{2}$$

with: $U_Z = \partial U\left(C,Z\right)/\partial Z,\ U_C = \partial U\left(C,Z\right)/\partial C$.

Several situations must be considered according to whether or not the constraints[4] of minimum quality and market equilibrium are bounded. The first situation occurs when physicians use consultation length to maximise patient satisfaction and thereby attract demand and balance the local market of medical consultations. In this case, the market constraint is bounded and the quality constraint is relaxed; in this way, the length of consultation offered is greater than the minimum fixed duration. This results in the system:

$$\left(\right)\left(\right) \quad \_ \quad \_ \tag{3}$$

which determines both the length and the number of consultations realised by the doctor. Here, ε_2 represents the length-elasticity of demand. The budgetary constraint and the time

[4] The list of inequality constraints is not exhaustive. A certain number of constraints were ignored as being non-pertinent for the analysis undertaken in this paper. For example, this is true for the constraint $Z \leq Z_0$, which is widely used in studies concerning participation on the labour market. In this paper, all doctors questioned earned at least a part of their professional income from their independent activities, and they did not choose total inactivity as being an optimum solution. The existence of large fixed costs linked to the independent activity of the doctor (length of schooling, fixed installation costs) is *a priori* sufficient to guarantee the existence of an internal solution to the labour supply problem.

constraint provide the recursive definition of the level of consumption and the level of leisure achieved. This system of equations demonstrates that the choice of the consultation length is based both on physicians' preferences in terms of consumption and leisure and on the characteristics of the demand. Simple calculus shows that the marginal rate of substitution of consumption for leisure (U_Z / U_C) is equal to the "fee" $\overline{\ }$, corrected by a factor [illegible], where ε_2 simplifies the mathematical writing of the elasticity of the demand to *b*.

This former correction can be explained by the specificities of the fee-for-service activity. Indeed, in the context of the medical activity, the doctor controls the length of consultation. Therefore, the pertinent remuneration is not the payment of the service, $\overline{w}$, but rather the price per consultation time unit $\overline{w}/b$. The margins of adjustment are greater than for an "ordinary" employee due to the ability to fine-tune total work time in accordance with the length (given by *b*) and number of consultations accepted (given by elasticity ε_2).

1.3. Choice of activity and "deregulated fees"

The ability to adjust prices offers the doctor an additional opportunity to modify the demand on her services (in addition to the variable *b*). This situation occurs when the doctor is not subject to a fixed-price agreement, such as with Social Security in France. In this case, the first-order Kuhn and Tucker conditions of programme (1) can be expressed as follows, maximising *U* in *n*, *b* and *w*:

$$\begin{cases} wU_C - bU_Z + \lambda_2 = 0 \\ -nU_Z + \lambda_1 - \lambda_2 \partial d(w,b)/\partial b = 0 \\ nU_C - \lambda_2 \partial d(w,b)/\partial w = 0 \\ \lambda_1 \left(b - \overline{b}\right) = 0 \\ \lambda_2 \left(n - d(w,b)\right) = 0 \end{cases} \quad (5)$$

When doctors can choose the consultation price, the market is automatically balanced (demand = supply for all $\lambda_2 \neq 0$)[5]. When the duration constraint is not bounded ($b > \overline{b}$), the choice of the quantity, length, and price of the consultations obeys:

[5] The particular case of zero leisure $(Z = 0)$ is an exception. This specific case is not considered here. In the empirical section, the case is excluded, since the total work-time necessarily requires provision for rest time.

$$\begin{cases} U_Z / U_C = (w/b)\left[\varepsilon_2 / (1+\varepsilon_2)\right] \\ U_Z / U_C = (w/b)\left[(1+\varepsilon_1)/\varepsilon_1\right] \\ n = d(w,b) \end{cases} \quad (6)$$

where ε_1 represents the price-elasticity of demand.

This can also be expressed by:

$$\begin{cases} U_Z / U_C = (w/b)\left[\varepsilon_2 / (1+\varepsilon_2)\right] \\ 1+\varepsilon_1+\varepsilon_2 = 0 \\ n = d(w,b) \end{cases} \quad (7)$$

The physician thus chooses the length and the price of consultation according to the characteristics of the patients in order to balance "price effects" and "quality effect" in her demand $(1+\varepsilon_1+\varepsilon_2=0)$. The first two equations in (7) could be written as a mark-up over price and a mark-up over consultation cost with . In this situation of "deregulated fees," the doctor has a new variable for adjusting her market (by managing her list of active patients) and acts according to the best interests of her consumption/leisure trade-off. In other words, the length of consultation is not the only variable for adjusting total demand for the doctor: *w* is added to *b*. In this second case, the first-order conditions give $1+\varepsilon_1+\varepsilon_2=0$, which gives the conditions of the trade-off between quality and price – with $\boldsymbol{\varepsilon_1}$ denoting the elasticity of demand to the price. In other words, the ability of the GP to regulate demand by price--instead of only by length of consultation--allows her to escape the situation in which she would have to decrease quality in order to gain leisure. In this way, creating a non-fixed-fees sector for independent GPs is expected to increase social well-being.

However, note that a "special case" occurs when the physician, while free to choose the price, decides to modulate only the length of consultation and to adopt the regulation price level for her consultations. In this situation, the doctor deliberately chooses to position herself at as a result of her preferences and economic constraints, without being linked to any institutional constraint. This "corner solution" to the lowest fee may correspond to a situation in which the elasticity of demand to price is so high (poor patients, for example) that it is not possible to maintain a substantive clientele (*n*) by any adjustment of the quality/price ratio (*b/p*). Carrère (1991) has already shown that doctors can choose this corner solution when working with poor clients.

2. The data

The sample of doctors for our analysis is taken from a panel survey that has been conducted since March 2007 and that examines the medical practices of 1,901 general practitioners in five French regions: Basse–Normandie, Bourgogne, Bretagne, Pays de la Loire, and Provence Alpes Côte d'Azur. The panel was compiled from a joint initiative of the Ministry of Health, the National Federation of the Regional Centres for Disease Control (ORS), and the five Regional Unions of Self-employed Doctors (URML) in the regions concerned. In each region, the doctors selected for this study are representative of the overall population of GPs (see Aulagnier et al. 2007). The sample was obtained by random stratified sampling with the strata defined by gender, age (under 45, 45-54, 54 and older in 2006) and location (urban, suburban, rural). Doctors planning to stop practising or to move out of the region, as well as those who practiced *exclusively* complementary or alternative medicines such as homeopathy and acupuncture were excluded. The first survey wave took place in March and April 2007. It collected data from GPs concerning levels of activity, such as workload, list size, and number and type of consultations. This wave also includes data from the Individual Receipt for Activity and Prescribing (IRAP), an administrative document given to GPs by the Social Security, which records all reimbursed spending of patients. It enables the precise computation of activity for each practitioner of the panel. The three variables of interest used in the present analysis were obtained as follows.

The variable "leisure time" (in hours per week) is defined as the time remaining after deduction of the time each doctor reported to have worked: $Z=Z_0-(n.b)$. More precisely, leisure time is calculated as seven times 24 hours (Z_0) minus the declared number of hours worked for a typical week, i.e. a week without public holidays or other holidays. In this calculation, we nevertheless added the weekly leisure time corresponding to the declared number of weeks of holidays.

The variable "length of consultation" (b, in minutes) was calculated by dividing the time devoted to patients (total time worked as an independent, minus the time devoted to administrative tasks, medical training, and speaking with medical representatives) by the number of consultations. The calculation takes into account a constant transport time for all house calls of 10-20 minutes, with the precise value depending on whether the GP was located in an urban or rural area. We obtained an average rhythm of practice, which is not observed directly on any specific day, but rather reflects average rhythm of activity over an entire year.

The variable "price of consultation", w, is declared by each GP in sector 2 as the "usual fees demanded". Generally, GPs in sector 2 display their fees in the waiting room. Thus, we

can hypothesize that GPs have declared this amount, although GPs can modulate their fees case by case, "with tact and moderation" as the Medical Council ("Ordre des médecins") describes. Our GP sample includes 120 doctors in sector 2 (1,556 in sector 1). In sector 1, the fee for consultation was fixed at 21 euros in 2007 ($\overline{w}$).

The calculation of the three variables above is based on survey data. These data have one disadvantage in that they are partially self-reported by physicians. On the other hand, the data provide information not available elsewhere, for example, data concerning unregulated fees, income, or *total* work time, which includes "non-medical tasks" such as administrative work, waiting and reception times of patients, reading and research time, and self-training.

Other information that could lead to an occasional increase in the price or length of consultations was not available in the database. For example, information was unavailable on the type of consultation (week-end, public holiday, night, emergency, on-call), the content of the consultation (type of pathology, technical or surgical intervention undertaken during the consultation), and the reason for the consultation (first consultation at the request of the patient, or follow-up consultation to monitor a previously identified pathology). Nevertheless, we can control our econometric regressions, which are generated using averaged variables for each GP, by globally characterising of their patient-list: % of patients between two given ages and % under the poverty level (see Tables 2-7).[6]

The average age of respondent physicians is 52 for men and 47 for women. Just over half (55.5%) of the physicians work in group practices, while 41.5% own their own practice.

Table 1. Descriptive Statistics: consultation length, leisure time

Variable [expressed as mean (stand. error)]	**Billing sector 1 : "fixed fees" (n = 1556)**	**Billing sector 2 : "unregulated fees" (n = 120)**
Consultation length (minutes)	24.9 (10.7)	34.8 (18.2)
Leisure time per week (hours)	69.0 (13.0)	70.1 (11.5)
Average consultation fee (euros)	21 (-)	30.2 (9.2)

Note: Table 1 includes the 1,676 GPs for whom econometric analysis was possible (information for all variables was complete). Half of the 225 missing GPs could not be included in the final sample for technical reasons, including the impossibility of matching them with the database-system of the Social Security, known in French as the Système National d'Information Inter-Régime de l'Assurance Maladie (SNIIRAM).

GP respondents reported an average weekly working-time, including time on call, of 56.6 hours. Male doctors work considerably more than female doctors throughout their

[6] Consultations undertaken outside the scope of reimbursed healthcare are not considered, e.g., telephone or free consultations.

professional life: 58.6 hours per week compared to 50.9 for women. However, the weekly working time does not differ significantly between the two GP groups that we defined for this study: 56.7 hours for sector 1, compared to 56.0 hours for sector 2. The average consultation length for respondent doctors, including the periods of inactivity between patients, is 25.6 minutes, with significant differences ($p < 0.0001$) based on gender (29.0 minutes for women compared to 24.5 minutes for men) and sector (24.9 minutes for sector 1 compared to 34.8 minutes for sector 2). The average price of consultation in sector 2 is 30.2 euros.

3. Results

3.1 Lessons from the theoretical model for the estimation strategy

The theoretical model has shown two important points that allow us to better define the empirical study:

-First, the set of constraints, as well as the results of the optimisation program, are clearly different between sector 1 and sector 2. It would be erroneous to pool the data and test a unique econometric model for the whole sample. There are in fact two features of choice for each sector of activity (fix fees versus unregulated fees).

-Second, the econometric model has to be estimated in a structural form because both the length of consultation and the total workload are endogenous to one another.[7] The first-order conditions of the theoretical analysis demonstrate a *concomitant* determination of hours worked (or leisure time) and length of GP consultation, both as a function of the environment of the GP (i.e. the characteristics of the patients, and the set of economic constraints linked to the sector of activity), and as a function of the personal characteristics of the GP (psychological parameters concerning her taste for leisure or family constraints, any of which may affect her availability to work).

Subsequently, the econometric model is estimated in a structural form using a linear system of simultaneous equations. The endogeneity of the two variables of interest (length of consultation and leisure time) is tested separately for each sector of activity. All the continuous variables are converted into logarithms, which enables us to interpret the estimated coefficients as elasticities while simultaneously reducing the heteroskedasticity of the model.

[7] Thornton and Eakin (1998) defend a similar method for both price and labour supply. Note that we also test the endogeneity of fees, and find no endogeneity once the endogeneity of consultation length has been taken into account.

The objectives of the econometric study are two-fold. The first objective is to verify that doctors' choices are indeed affected by the "market characteristics" of the sector of activity in which they operate, and, in particular, to ascertain that GPs benefiting from deregulated fees (sector 2) adopt a different behaviour from other GPs (sector 1). The second objective is to identify the direction of certain effects that remained ambiguous in the theoretical model, in particular the "price-sensitivity" of leisure time and length of consultations, both of which can be positive or negative depending on whether income effects or substitution effects dominate—as is the case in the microeconomics of any labour supply. This is even more complex in the case of independent supply of medical services because, in addition to their total labour supply, doctors may also adjust the consultation itself by increasing the number of shorter consultations. In sector 2, an additional level of ambiguity is observed since GPs set both the price and length of the consultations. Note that, since 1990, GPs cannot enter sector 2 except in the exceptional case when she has an especially high level of education. Thus, we disregard problems of participation bias in sectors of practice.

The results are presented in Tables 2-3 for sector 1 and in Tables 4-5 for sector 2. In each table, the model adopted according to endogeneity and heteroskedasticity tests (White, 1980, Lee *et al.*, 1980, Davidson et MacKinnon, 1993, Pesaran et Taylor, 1999) is underlined in bold. All analyses were carried out using Stata Version 9.2. In our discussion of the results, we comment only on the effects that affect the variables of the theoretical model (consultation length and leisure time) in relation to the sector (1 versus 2) and to the prices set in sector 2. The other econometric effects conform to economic intuition.

3.2. Price-elasticity of the length of consultation: the higher the fees for consultation, the longer the consultations.

In Table 4, the coefficient of 0.82 obtained for sector 2 can be perfectly interpreted in terms of classic price-elasticity. For a 10% increase in the price applied, the average length of consultation increases by 8.2%, i.e. an average of three minutes longer. It is clear that this result, obtained in sector 2, documents a behaviour in which doctors are free to set their own price and the patients are free to accept the consultation, its length, and its fees, always assuming that an alternative exists in the geographical zone of the patient, which, given the density of medical facilities in France, is certainly realistic. In other words, in the present case, the econometric analysis measures an "agreement" between the GP and the patient that serves to *balance* the length of the consultation and the price paid. The consultation is longer but it is also more expensive.

In sector 1, it was not possible to observe price elasticity in this first transversal study; all doctors charged the same regulated fee of 21 euros in 2007. In future research, repeated collection of data could help to evaluate reactions to official changes in fees.

3.2. Deregulated fees and doctor's behaviour regarding leisure choice: increased flexibility of behaviour in sector 2

First, the behaviours of doctors, as estimated by separate structural models for sector 1 and sector 2, reveal substantially different leisure choices. The econometric result illustrates the endogeneity of leisure time in relation to the length of consultation for GPs in sector 1 (Table 3). This is not the case in sector 2 (Table 5). The same econometric approach also shows that, in both cases, the inverse correlation of length of consultation to leisure is not significant ($p > 0.5$ in both cases, Tables 2 and 4). In sector 1, GPs seem to establish consultation length *first* according to external constraints, independently of their leisure time choice, and more as a function of the patients' characteristics. This consultation length subsequently determines the leisure time in sector 1 in a negative manner (correlation coefficient = –0.052, $p < 0.001$). In other words, the more time a doctor can devote to patients, the less time the doctor has for leisure time, which is a logical relationship. In contrast, Table 5 indicates a situation in sector 2 in which GPs seem to retain a certain degree of personal freedom in their leisure choices. This latter variable of interest shows no correlation with consultation length ($\beta=0.039$, $p < 0.603$).

This result appears highly intuitive in light of the theoretical results obtained in section 1. GPs in sector 2 can compensate for the deleterious effects of a relatively high average consultation length on their leisure time by charging higher prices. Fee is a variable of adjustment that substitutes for leisure time in sector 1. For an aged or seriously ill clientele, who have longer time consultations than other patient populations, GPs in sector 2 can, for example, maintain a satisfactory income by increasing the price per consultation. In sector 1, this strategy is not possible and the GP suffers more from the constraints imposed by the characteristics of her patients. If she wishes to maintain a high income, her leisure time is the only variable of adjustment. The higher the average consultation length, the less leisure time is available.

Finally, a third equation is tested for sector 2. This equation examines the possible endogeneity of fee to the two other dependant variables, leisure time and consultation length. The exogeneity test is rejected for the length of consultation ($p < 0.001$). Table 6 shows the resulting convenient model produced with the 3SLS methodology.

Conclusion

Conclusions from this study address several different dimensions of the labour supply problem of GPs working independently in France. If we concentrate solely on the

relationship between price and length of consultation, and we consider the situation in the most favourable terms as possible, then the study confirms a *positive* correlation between consultation length and price. It appears that physicians translate a price increase into an improved quality of treatment, as estimated from the average consultation length. This result confirms the theoretical analysis developed in section 1. In the context of a social justification for deregulated fees, this result tends to legitimise sector 2 since it enables doctors to separate the need for treatment linked to their patients from their own considerations and economic constraints. When doctors can equate each elementary consultation to an *ad hoc* price, the price per minute of the medical intervention can be held constant regardless of the length of the consultation. The economic neutrality of "patients in good health – seriously ill patients" is perfectly achieved.

Conversely, if we take a more severe standpoint, we are struck by the result considered *a contrario*. In the event of regulation of the price of consultations (in sector 1), doctors tend to *increase* the number of *short* consultations in order to compensate for the decrease in income. This effect is very often voiced in the public debate on the possibility of increasing the price of medical consultation.

In sum, these results strengthen the idea that consultation length devoted to patients cannot be easily disconnected from doctors' preferences (sector 1 composes 90% of GPs). The unregulated fees strategy is one possibility. However, it must be balanced with its cost, namely an increase in fees and the likely consequence of a redistribution of welfare from patient to doctors. In this way, our results could be seen as a necessary, but clearly not sufficient, condition to legitimate unregulated fees in general practices.

Appendix A: Tables

Table 2. Length of consultation (log) – Sector 1

	OLS	OLS and robust	**2SLS**
Leisure time (log)	-0.218	-0.218	**-0.268**
	(0.000)**	(0.000)**	**(0.544)**
Male	-0.158	-0.158	**-0.161**
	(0.000)**	(0.000)**	**(0.001)****
% of home visits	-0.537	-0.537	**-0.554**
	(0.000)**	(0.021)*	**(0.007)****
Alternative medicine (occasionally)	0.074	0.074	**0.073**
	(0.032)*	(0.020)*	**(0.041)***
Desire to reduce working time	-0.130	-0.130	**-0.135**
	(0.000)**	(0.000)**	**(0.009)****
Age	-0.004	-0.004	**-0.004**
	(0.041)*	(0.029)*	**(0.040)***
Married	-0.159	-0.159	**-0.158**
	(0.000)**	(0.000)**	**(0.000)****
Group practice	-0.109	-0.109	**-0.107**
	(0.000)**	(0.000)**	**(0.001)****
% of patients with free healthcare because of low income	-0.734	-0.734	**-0.735**
	(0.000)**	(0.000)**	**(0.000)****
% of patients between 60-69 y (log)	-1.038	-1.038	**-1.069**
	(0.076)+	(0.086)+	**(0.105)**
% of patients between 0-16 y (log)	-1.846	-1.846	**-1.869**
	(0.000)**	(0.000)**	**(0.000)****
Spouse working	0.056	0.056	**0.057**
	(0.038)*	(0.043)*	**(0.040)***
Constant	5.132	5.132	**5.357**
	(0.000)**	(0.000)**	**(0.007)****
Number of observations	1520	1520	**1519**
R^2 #	0.126	0.126	**0.117**
R^2 adjusted #	0.119	0.119	**0.111**
AIC	1862.066	1862.066	**1885.399**
BIC	1931.310	1931.310	**1949.364**
White's heteroskedasticity test (P-value)	0.162	-	**-**
Sargan's over-identification test (P-value)	-	-	**0.689**
White/Koenker heteroskedasticity test (P-value)	-	-	**0.169**
Pagan/Hall heteroskedasticity test (P-value)	-	-	**0.178**
Anderson under-identification test (P-value)			**0.000**

P-values in brackets; + significant at 10%; * significant at 5%; ** significant at 1%
Pesaran-Smith R^2 generalised for the 2SLS

Nakamura/Nakamura's test gives "Leisure time" as endogenous (p = 0.000); therefore the 2SLS model shows a better fit (in bold).

Table 3. Leisure time (log) – Sector 1

	OLS	**OLS and robust**	2SLS
Length of consultation (log)	**-0.052**	**-0.052**	-0.054
	(0.000)**	**(0.000)****	(0.470)
Desire to reduce working time	**-0.107**	**-0.107**	-0.108
	(0.000)**	**(0.000)****	(0.000)**
Group practice	**0.042**	**0.042**	0.043
	(0.000)**	**(0.000)****	(0.003)**
Urban location	**-0.053**	**-0.053**	-0.051
	(0.000)**	**(0.000)****	(0.000)**
Male	**-0.087**	**-0.087**	-0.087
	(0.000)**	**(0.000)****	(0.000)**
Offers free consultation (sometimes)	**-0.031**	**-0.031**	-0.031
	(0.030)*	**(0.026)***	(0.033)*
% of home visits	**-0.375**	**-0.375**	-0.388
	(0.000)**	**(0.000)****	(0.000)**
% of patients between 0-16 y (log)	**-0.257**	**-0.257**	-0.280
	(0.032)*	**(0.051)+**	(0.091)+
Additional diploma since doctorate	**-0.030**	**-0.030**	-0.029
	(0.009)**	**(0.008)****	(0.015)*
Constant	**4.626**	**4.626**	4.638
	(0.000)**	**(0.000)****	(0.000)**
Number of observations	**1537**	**1537**	1519
R^2 #	**0.147**	**0.147**	0.130
R^2 adjusted #	**0.142**	**0.142**	0.126
AIC	**-322.409**	**-322.409**	-312.139
BIC	**-269.033**	**-269.033**	-263.650
White's heteroskedasticity test (P-value)	**0.005**	-	-
Sargan's over-identification test (P-value)	-	-	0.180
White/Koenker heteroskedasticity test (P-value)	-	-	0.029
Pagan/Hall heteroskedasticity test (P-value)	-	-	0.032
Anderson under-identification test (P-value)			0.000

P-values in brackets; + significant at 10%; * significant at 5%; ** significant at 1%
Pesaran-Smith R^2 generalised for the 2SLS

Nakamura/Nakamura's test gives "Length of consultation" as exogenous (p = 0.781). An OLS regression (in bold) shows a better fit.

Table 4. Length of consultation (log) – Sector 2

	OLS	*OLS robust*	*2SLS*	***3SLS***
Leisure time (log)	-0.175	-0.175	-1.219	**-0.111**
	(0.421)	(0.356)	(0.065)+	**(0.600)**
Price of consultation (log)	0.820	0.820	0.849	**0.706**
	(0.000)**	(0.000)**	(0.000)**	**(0.068)+**
% of home visits	-0.856	-0.856	-1.205	**-1.102**
	(0.052)+	(0.075)+	(0.023)*	**(0.027)***
Group practice	-0.167	-0.167	-0.180	**-0.210**
	(0.050)*	(0.050)+	(0.059)+	**(0.012)***
Internet connection	0.583	0.583	0.755	**0.409**
	(0.016)*	(0.023)*	(0.009)**	**(0.042)***
% of patients between 0-16 y (log)	-1.239	-1.239	-1.441	**-1.169**
	(0.036)*	(0.021)*	(0.031)*	**(0.035)***
Offers free consultation (sometimes)	-0.235	-0.235	-0.297	**-0.193**
	(0.010)*	(0.011)*	(0.007)**	**(0.013)***
Male	-0.147	-0.147	-0.262	**-0.119**
	(0.177)	(0.079)+	(0.059)+	**(0.252)**
Alternative medicine (occasionally)	0.169	0.169	0.156	**0.172**
	(0.045)*	(0.068)+	(0.099)+	**(0.043)***
Urban location	0.223	0.223	0.261	**0.211**
	(0.132)	(0.135)	(0.136)	**(0.176)**
Participates in continuing medical education	0.125	0.125	0.040	**0.189**
	(0.274)	(0.321)	(0.772)	**(0.065)+**
Constant	1.258	1.258	5.718	**1.463**
	(0.256)	(0.233)	(0.046)*	**(0.323)**
Number of observations	119	119	117	**116**
R^2 #	0.553	0.553	0.459	**0.550**
R^2 adjusted #	0.507	0.507	0.402	**0.508**
AIC	122.296	122.296	144.845	**121.018**
BIC	155.646	155.646	177.991	**151.589**
White's heteroskedasticity test (P-value)	0.061	-	-	-
Sargan's over-identification test (P-value)	-	-	0.955	-
White/Koenker heteroskedasticity test (P-value)	-	-	0.103	-
Pagan/Hall heteroskedasticity test (P-value)	-	-	0.150	-
Anderson under-identification test (P-value)	-	-	0.014	-

P-values in brackets; + significant at 10%; * significant at 5%; ** significant at 1%
Pesaran-Smith R^2 generalised for the 2SLS

Nakamura/Nakamura's test gives "Leisure time" as exogenous (p = 0.114).

Nakamura/Nakamura's test gives "Price of consultation" as endogenous (p=0.000), and the reverse correlation also valid (Table 6). Therefore the 3SLS model shows a better fit (in bold).

Table 5. Leisure Time (log) – Sector 2

	OLS	*OLS & robust*	***2SLS***
Length of consultation (log)	0.007	0.007	**0.039**
	(0.847)	(0.839)	**(0.603)**
Price of consultation (log)	0.054	0.054	**0.018**
	(0.490)	(0.439)	**(0.872)**
Desire to reduce working time	-0.075	-0.075	**-0.075**
	(0.019)*	(0.016)*	**(0.019)***
Spouse working	0.098	0.098	**0.101**
	(0.005)**	(0.014)*	**(0.005)****
Married	-0.193	-0.193	**-0.197**
	(0.003)**	(0.002)**	**(0.003)****
% of patients exempted from payment for medical reasons	-1.369	-1.369	**-1.347**
	(0.005)**	(0.014)*	**(0.006)****
% of patients with free healthcare because of low income	1.952	1.952	**1.977**
	(0.006)**	(0.002)**	**(0.005)****
Offers free consultation (sometimes)	-0.075	-0.075	**-0.065**
	(0.053)+	(0.028)*	**(0.131)**
% of patients between 60-69 y (log)	1.647	1.647	**1.611**
	(0.045)*	(0.060)+	**(0.051)+**
Has an internet connection	0.075	0.075	**0.061**
	(0.444)	(0.016)*	**(0.553)**
Constant	4.175	4.175	**4.198**
	(0.000)**	(0.000)**	**(0.000)****
Number of observations	117	117	**117**
R^2 #	0.239	0.239	**0.210**
R^2 adjusted #	0.167	0.167	**0.149**
AIC	-81.943	-81.943	**-60.378**
BIC	-51.559	-51.559	**-32.095**
White's heteroskedasticity test (P-value)	0.649	-	**-**
Sargan's over-identification test (P-value)	-	-	**0.611**
White/Koenker heteroskedasticity test (P-value)	-	-	**0.664**
Pagan/Hall heteroskedasticity test (P-value)	-	-	**0.647**
Anderson under-identification test (P-value)	-	-	**0.000**

P-values in brackets; + significant at 10%; * significant at 5%; ** significant at 1%
Pesaran-Smith R^2 generalised for the 2SLS

Nakamura/Nakamura's test gives "Length of consultation" as endogenous (p = 0.028); therefore the 2SLS model shows a better fit (in bold).

Table 6. Price of consultation (log) – Sector 2

	OLS	*OLS & robust*	***3SLS***
Length of consultation (log)	0.205	0.205	**0.800**
	(0.000)**	(0.000)**	**(0.000)****
Participates to professional organisations (/unions)	-0.035	-0.035	**-0.035**
	(0.339)	(0.335)	**(0.601)**
Alternative medicine (occasionally)	0.041	0.041	**-0.194**
	(0.310)	(0.278)	**(0.027)***
Male	-0.057	-0.057	**0.062**
	(0.288)	(0.227)	**(0.527)**
Urban location	-0.177	-0.177	**-0.273**
	(0.010)*	(0.004)**	**(0.028)***
% of patients between 0-16 y (log)	0.660	0.660	**1.480**
	(0.057)+	(0.087)+	**(0.022)***
% of patients between 60-69 y (log)	4.192	4.192	**1.101**
	(0.000)**	(0.000)**	**(0.524)**
% of patients between 70 ans et plus (log)	-1.272	-1.272	**0.248**
	(0.002)**	(0.004)**	**(0.756)**
Leisure time (log)	0.085	0.085	**0.011**
	(0.408)	(0.397)	**(0.955)**
Constant	2.035	2.035	**0.315**
	(0.000)**	(0.000)**	**(0.736)**
Number of observations	117	117	**117**
R^2 #	0.519	0.519	**0.371**
R^2 adjusted #	0.479	0.479	**0.328**
AIC	-48.829	-48.829	**-13.916**
BIC	-21.207	-21.207	**11.539**
White's heteroskedasticity test (P-value)	0.009	-	**-**
Sargan's over-identification test (P-value)	-	-	**0.036**
White/Koenker heteroskedasticity test (P-value)	-	-	**0.065**
Pagan/Hall heteroskedasticity test (P-value)	-	-	**0.161**
Anderson under-identification test (P-value)	-	-	**0.000**

p values in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%

Nakamura/Nakamura's test gives "Price of consultation" as endogenous (p=0.000), and the reverse correlation also valid (Table 4). Therefore the 3SLS model shows a better fit (in bold).

Appendix B. The French Medical Sector

Main characteristics of the French general practice system		
	Sector 1	**Sector 2**
Payment scheme	Fee-for-service	Fee-for-service
Prices of medical services	Regulated prices, "prix conventionnés": fixed by an agreement between the GPs and the health insurance administration ("Sécurité Sociale")	Free pricing (higher than in sector 1); Cost for the GPs: greater personal social insurance contribution
Coverage and dates	Represents approximately 90% of GPs	Created in 1980; access closed in 1990
Reimbursement for the patients	Generally, 100% of the reference price. 70% by Social Security, 30% by complementary insurance, ("mutuelle") if the patient has it (90%).	Generally, the extra price has to be paid by the patient, though certain complementary insurance policies cover extra costs.